

CLAIMS

1. Purification installation for an aqueous effluent containing organic material of the type including at least one reaction vessel (1) with at least one inlet (9) of the said effluent, at least one  
5 outlet (10) of the said effluent, at least one vent (5), injection means (2) for at least one oxidising gas, the said reaction vessel containing a bed of a material (3) capable of catalysing the oxidation reaction of the said organic material of the said  
10 effluent and / or adsorbing this organic material,

characterised in that the said reaction vessel also includes an immersed membrane (4) filtration device and in that the said reaction vessel (1) defines a single chamber including oxidation and filtration  
15 treatments of the said effluent, the said chamber being designed such that the said effluent and the said oxidising gas are injected in counter-current-towards the said bed of catalyst material (3) and then towards the said membrane (4) filtration device.

20 2. Purification installation according to claim 1, characterised in that the said material (3) consists of a solid mineral material with a capacity for adsorption of organic materials.

25 3. Purification installation according to claim 2, characterised in that the said solid mineral material is doped in metallic substances.

4. Purification installation according to any one of claims 1 to 3, characterised in that the said

material (3) is present in the said reaction vessel (1) in the form of a fluidised bed.

5        5. Purification installation according to claim 4, characterised in that the said material (3) has a size grading less than 100  $\mu\text{m}$ .

6. Purification installation according to claim 5, characterised in that the said material (3) has a size grading between about 10 nm and about 40  $\mu\text{m}$ .

10       7. Purification installation according to one of claims 2 to 6, characterised in that the said material (3) comprises at least one material belonging to the following group:

- alumina;
- titanium;
- 15       - coal;
- activated carbon;
- polymetallic oxides.

20       8. Purification installation according to any one of claims 1 to 7, characterised in that the membranes (4) are micro-filtration membranes.

9. Purification installation according to any one of claims 1 to 7, characterised in that the membranes (4) are ultra-filtration membranes.

25       10. Purification installation according to any one of claims 1 to 7, characterised in that the membranes (4) are nano-filtration membranes.

11. Purification installation according to any one of claims 8 to 10, characterised in that the said membranes (4) are of the mineral type.

12. Purification installation according to any one of claims 8 to 10, characterised in that the said membranes (4) are of the organic type.

13. Purification installation according to any one of claims 1 to 12, characterised in that the said catalyst material (3) forms a pre-layer on the surface of the said membrane (4) filtration device.

14. Purification installation according to any one of claims 1 to 13, characterised in that the said oxidising gas comprises at least one of the oxidants belonging to the following group:

- air;
- ozone;
- ozoned air;
- nitrogen oxides;
- oxygen.

15. Purification installation according to any one of claims 1 to 14, characterised in that it includes means of adding  $H_2O_2$  into the said reaction vessel.

16. Purification installation according to any one of claims 1 to 15, characterised in that it comprises a recirculation loop (7) of the said effluent in the said reaction vessel.

17. Purification installation according to any one of claims 1 to 16, characterised in that it comprises a recirculation loop (6) for gases output from the said vent (5).

18. Purification installation according to any one of claims 1 to 17, characterised in that the said reaction vessel (1) is made in the form of a column with no mechanical stirring.

19. Process implemented using an installation according to any one of claims 1 to 18, characterised in that the said oxidising gas is added continuously into the said reaction vessel (1).

5        20. Process according to claim 19, characterised in that the contact time between the said effluent and the said material (3) is between about 5 minutes and about 3 hours.

10       21. Process according to claim 20, characterised in that the contact time between the said effluent and the said material (3) is between about 30 minutes and about 60 minutes.

15       22. Process according to any one of claims 19 to 21, characterised in that it comprises a step to re-circulate the said effluent.

23. Process according to any one of claims 19 to 22, characterised in that it comprises a step to re-circulate gases.

20       24. Process according to any one of claims 19 to 23, characterised in that the filtration step is performed by suction in external - internal configuration.

25       25. Process according to claim 24, characterised in that the said filtration step is done with a suction pressure of less than 1 bar.

26. Process according to claim 25, characterised in that the said filtration step is done with a suction pressure of between 0.1 bars and about 0.8 bars.